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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,114	04/08/2004	Yoshihiko Imanaka	042307	8372

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EXAMINER

DANG, TRUNG Q

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 09/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/820,114

Applicant(s)

IMANAKA ET AL.

Examiner

Trung Dang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 1-12 and 20-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-19 and 47-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 4/8/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the Group II invention, claims 13-18 and 47-49 in the reply filed on 8/8/06 is acknowledged.

Note that the previous restriction requirement dated 7/14/06 is erroneous in that claim 19 should be included in the Group II invention because claim 19 depends on claim 13. Accordingly, the following Office action will treat claims 13-19 and 47-49 as being elected without traverse by applicants.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 13, 16, 47 are rejected under 35 U.S.C. 102(b) as being anticipated by McMillan et al. (US 5,759,923).

With reference to Fig. 8, McMillan teaches a method of fabricating a circuit substrate, said circuit substrate having any of a passive element (capacitor 80) and an interconnection pattern 88, said passive element comprising at least one of a dielectric film 77/86, a resistance film 82 and a conductor film 81/84/88, said method comprising a film forming step, said film forming step forming at

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least one of said dielectric film 77/86, said resistance film 82 by ejecting aerosol of a fine particle material together with a carrier gas. See col. 14, lines 28-37 in conjunction with col. 3, lines 58-67 and col. 11, lines 24-35.

For claim 47, the dielectric film 77/86 of the reference reads on the claimed interlayer insulation film, and the metallic conductor 88 reads on the claimed conductor layer.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over McMillan as above in view of Hara et al. (US 2001/0030122).

McMillan teaches a process as described above with respect to claim 47.

McMillan differs from the claim in not disclosing the technique of which the metallic conductor 88 is formed.

Hara teaches a metallic conductor layer can be formed by a publicly known dry plating method such as sputtering, CVD, vacuum evaporation or a wet plating method such as electrolytic plating and non-electrolytic plating (para. 0041).

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It would have been obvious to one of ordinary skill in the art to employ any dry or wet plating method suggested by Hara in forming the conductor layer 14 because the application of a well-known process to make the same would have been within the level of an artisan and require no more than a general knowledge of one skilled in the art.

6. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over McMillan as above in view of Hasegawa et al. (US 6,717,218).

McMillan teaches a process as described above with respect to claim 47.

McMillan differs from the claim in not disclosing that the source/drain contact holes in the interlayer insulation film 77/86 are formed by using a HF acid while masking said interlayer insulation film.

Hasegawa teaches a process for forming source/drain contact holes in which said contact holes are formed in an interlayer insulation film 12/13/14 by using HF acid while masking the interlayer insulation film with a photoresist layer 160 (Fig. 3C and col. 8, lines 18-22).

It would have been obvious to one of ordinary skill in the art to employ the wet etching method as suggested by Hasegawa in forming the source/drain contact holes in the interlayer insulation film 77/86 because the application of a known process to make the same would have been within the level of an artisan and require no more than a general knowledge of one skilled in the art.

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7. Claims 13, 15-17, 19 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo et al.(US 6,504,227) in view of Renn (US 2003/0048314).

With reference to Fig. 1, Matsuo teaches a method of fabricating a circuit substrate, said circuit substrate having any of a passive element (inductor 14) and an interconnection pattern 16a/16b, said passive element comprising at least one of an organic insulating film 13 having a low dielectric constant (col. 6, lines 62-63), a resistance film 18 and a conductor film 16c, said method comprising a film forming step, said film forming step forming said dielectric film 13 by spraying (read on the claimed ejecting) a mist (read on the claimed aerosol) of an insulating fluid mixed with granular (read on the claimed fine particle) insulating material. See col. 8, lines 6-12 and lines 52-53.

Matsuo differs from the claimed in not disclosing that said mist of insulating fluid containing granular insulating material is ejected together with a carrier gas as claimed.

Renn teaches a spraying process to deposit an organic material onto a substrate by depositing aerosolized particles as small as 20 nm in diameter using aerodynamic focusing (para. 0106). The process utilizes a carrier gas such as nitrogen, argon and helium as a force application means to propel the particles (para. 0055).

It would have been obvious to one of ordinary skill in the art to modify Matsuo's method by ejecting the mist of insulating fluid containing granular

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insulating material together with a carrier gas as suggested by Renn because the use of the carrier gas is necessary as a means to propel the particles to substrate so as to facilitate the film forming process.

For claims 15 and 17, see paragraphs [0067] and [0106] in Renn for the disclosure of velocity (about 10m/s) and particles size (as small as 20 nm in diameter). Application of these process parameters in depositing the dielectric film 13 in a trench having a thickness of at least 20 microns would have been obvious to one skilled in the art because Renn's process is to manufacture features having depth up to 100 microns (para. 0066).

For claim 19, see col. 8, lines 61-62 for the step of planarizing the dielectric film 13 by CMP (chemical mechanical polishing).

For independent claim 47, the insulating film 13 reads on the claimed interlayer insulation film because the insulating film 13 is formed in between substrate 11 and inductor 14 comprises Cu, Au, Ag or Al (corresponding to the claimed conductor layer)

8. Claims 14 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo et al. taken with Renn as applied to claims 13, 15-17 and 47 above, and further in view of Boeck et al. (US 5,880,018).

The combined process of Matsuo and Renn teaches a process as described above. The combined process includes a base substrate 11 and the insulation film 13 laminated on said base substrate, wherein the insulation film

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13 is an organic insulating film having a dielectric constant of about 2.6 (Matsuo, col. 7, lines 8-11).

The combination differs from the claims in not disclosing that the organic insulation film 13 comprises a resin material as claimed.

Boeck teaches various organic insulation materials having low dielectric constant ϵ . Such materials includes resins having $\epsilon \leq 3.5$, including BCB having ϵ of about 2.6 (col. 4, lines 45-65).

It would have been obvious to one of ordinary skill in the art to select the resin material suggested by Boeck for the organic insulation film 13 because it is well settle that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination (MPEP 2144.07).

9. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo taken with Renn as applied to claims 13, 15-17 and 47 above, and further in view of Hara et al. cited above.

The combined process of Matsuo and Renn teaches a process as described above with respect to claim 47.

The combined process differs from the claim in not disclosing the technique of which the conductor 14 is formed.

Hara teaches conductor layer made of Cu or Au can be formed by a publicly known dry plating method such as sputtering, CVD, vacuum evaporation

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or a wet plating method such as electrolytic plating and non-electrolytic plating (para. 0041).

It would have been obvious to one of ordinary skill in the art to employ any dry or wet plating method suggested by Hara in forming the conductor layer 14 because the application of a well-known process to make the same would require no more than a general knowledge of one skilled in the art.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trung Dang whose telephone number is 571-272-1857. The examiner can normally be reached on Mon-Friday 9:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR

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system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or

access to the automated information system, call 800-786-9199 (IN USA OR

CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Trung Dang', with a stylized, cursive script.

Trung Dang
Primary Examiner
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9/22/06